What Is Claimed Is:

1. A liquid crystal display (LCD) device for displaying an image, comprising:

first and second spaced transparent electrodes being constructed and arranged to have a voltage applied across the first and second transparent electrodes, the first transparent electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum; and

a liquid crystal (LC) layer positioned between the first and second transparent electrodes for selectively displaying the image in response to the voltage applied across the first and second electrodes.

2. The device of claim 1, wherein the transparent metal stack includes

a first metal layer having a first metal thickness;

a first interstitial layer having a first interstitial thickness formed on the first metal layer;

a second metal layer having a second metal thickness formed on the first interstitial layer;

a second interstitial layer having a second interstitial thickness formed on the second metal layer; and

a third metal layer having a third metal thickness formed on the second interstitial layer, wherein an arrangement of the metal and interstitial layers exhibits the photonic band gap structure.

3. The device of claim 2, further comprising at least one of:

a third interstitial layer having a third interstitial thickness formed on the third metal layer; and

a transparent substrate to support the first metal layer.

4. The device of claim 2, wherein the first, second, and third metal layers are selected from a group comprising all transition metal.

5. The device of claim 2, wherein the first, second, and third metal layers are selected from a group comprising silver, aluminum, copper, and gold.

6. The device of claim 2, wherein the first, second, and third metal layers are silver.

7. The device of claim 2, wherein the first, second, and third metal thicknesses are each between approximately 2.5 to 5 nanometers (nm) and approximately 40 to 60 nm.

8. The device of claim 2, wherein the first and second interstitial layers are selected from a group comprising semiconductor materials, ordinary dielectrics, and a combination of semiconductor and dielectric materials.

9. The device of claim 2, wherein the first and second interstitial layers comprise Magnesium Fluoride (MgF_2).

10. The device of claim 2, wherein
the first interstitial thickness is one of
between approximately 2.5 to 5 nanometers (nm), and
greater than 5 nm,
the second interstitial thickness is one of
between approximately 300 to 500 nm, and
greater than 500 nm.

11. The device of claim 1, wherein the non-visible wavelength range comprises the infrared (IR) region of the electromagnetic spectrum.

12. The device of claim 1, wherein the non-visible wavelength range comprises the ultraviolet (UV) region of the electromagnetic spectrum.

13. The device of claim 1, wherein the non-visible wavelength range comprises the infrared region to the microwave region of the electromagnetic spectrum.

14. The device of claim 2, wherein the first, second, and third metal layers are silver and the first, second, and third metal layer thicknesses are each approximately 27.5 nm, wherein the first and second interstitial layers are MgF_2 and the first and second interstitial thicknesses are each approximately 156 nm, wherein the visible wavelength range comprises the group of wavelengths between approximately 400 and 700 nm, wherein the non-visible wavelength range comprises the IR and microwave wavelength regions, and wherein the transmission of the visible wavelength range corresponds to at least approximately 40 percent transmission and the transmission of the non-visible wavelength range corresponds to approximately 10^{-5} transmission.

15. The device of claim 2, further comprising:

a plurality of metal layers having the first metal thickness, wherein the second and third metal thicknesses equal the first metal thickness; and

a plurality of interstitial layers having the first interstitial thickness, wherein the second and third interstitial thicknesses equals the first interstitial thickness, wherein the plurality of metal and interstitial layers are arranged in an alternating manner, and wherein the plurality of metal and interstitial layers corresponds to the visible and non-visible wavelength ranges.

16. The device of claim 2, further comprising first and second signal lines, respectively connected to the first and second electrodes, for applying the voltage across the first and second electrodes, wherein the first signal line is connected to at least one of the alternating metal layers of the transparent metal stack.

17. The device of claim 1, wherein the second electrode includes a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range.

18. The LCD device of claim 1, further comprising:

first and second LC aligning layers, respectively positioned adjacent the first and second transparent electrodes and in contact with the LC layer, for aligning LCD molecules in the LCD layer in predetermined directions,

a first transparent substrate for supporting the first transparent electrode;

a second transparent substrate and a color filter for supporting the second transparent substrate; and

first and second polarizing filters respectively overlaying outer surfaces of the first and second transparent substrates.

19. The LCD device of claim 1, wherein the LCD device is a Twisted Nematic LCD device, wherein an orientation of LC molecules in the LC layer twists or rotates through an angle of 90°across the LC layer.

20. The LCD device of claim 1, wherein the LCD device is a SuperTwisted Nematic (STN) LCD device, wherein an orientation of LC molecules in the LC layer twists or rotates through an angle of between 180° and 270°across the LC layer;

21. The LCD device of claim 1, wherein the LCD device is a Double SuperTwisted Nematic (DSTN) LCD, wherein a first Super Twisted Nematic (STN) second compensating STN LCD cell are bonded together in a back-to-back configuration;

22. The LCD device of claim 1, wherein the LCD device is a Triple Super Twisted Nematic LCD device.

23. The LCD device of claim 1, wherein the LCD device is a Film Compensated Super Twisted Nematic LCD device, wherein a plastic film is used as a compensator.

24. The device of claim 1, wherein the first transparent electrode has a conductivity of at least two orders of magnitude greater than a conductivity of Indium Tin Oxide.

25. An active matrix liquid crystal display (LCD) device, comprising:

a transparent substrate;

a matrix of transparent pixel electrodes formed on the transparent substrate, each of the transparent pixel electrodes including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum;

a switching device associated with each pixel electrode and being constructed and arranged to selectively apply a first voltage to the pixel electrode;

a transparent common electrode layer spaced apart from the matrix of pixel electrodes and being constructed and arranged to have a second voltage applied thereto; and

a liquid crystal layer positioned between the common electrode layer and the matrix of pixel electrodes to form a corresponding matrix of liquid

crystal (LC) image pixels, whereby each image pixel in the matrix of image pixels selectively transmits light in response to a voltage applied across the image pixel by the common electrode and an associated pixel electrode to form an image on the display.

26. The device of claim 25, further comprising:

a plurality of scanning lines formed in a first direction on the substrate; and

a plurality of data lines formed in a second direction on the substrate such that the scanning and data lines cross-over each other, and wherein

each switching device is formed at a cross-over portion between one of the scanning lines and one of the data lines, the switching device including

first and second control inputs connected respectively to the one of the data lines and the one of the scanning lines, and

an output connected to the pixel electrode for selectively applying a voltage to the pixel electrode in response to voltage signals on the ones of the scanning and data lines.

27. The device of claim 25, wherein the transparent common electrode includes a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum.

28. The device of claim 25, wherein conductivity of each transparent pixel electrode is at least two orders of magnitude greater than a conductivity of Indium Tin Oxide.

29. An passive matrix liquid crystal display (LCD) device, comprising:

a plurality of transparent first electrodes supported by a first substrate and extending in a first direction, the first electrodes being constructed and arranged to have a first voltage applied to selected ones of the first electrodes, each of the first electrodes including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a visible wavelength range and suppressing a non-visible wavelength range of the electromagnetic spectrum;

a plurality of transparent second electrodes supported by a second substrate and spaced apart from the first electrodes, the second electrodes extending in a second direction to cross-over the row electrodes and being constructed and arranged to have a second voltage applied to selected ones of the second electrodes; and

a liquid crystal (LC) layer positioned between the first and second electrodes and forming a matrix of LC pixel regions corresponding to the cross-over positions between the first and second electrodes, wherein each of the LC pixel regions selectively transmits light in response to a voltage applied across the pixel regions resulting from the first and second voltages, to thereby form an image.

30. A method of forming an image using a liquid crystal display (LCD) device, comprising:

exciting a liquid crystal layer between first and second electrodes in the LCD device by applying a voltage across the first and second electrodes, the first electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a first selected wavelength range and suppressing a second selected wavelength range.

31. A Light Emitting Structure (LES) device, comprising:

a cathode electrode adapted to have a first voltage applied thereto;

a substrate layer overlaying the cathode electrode;

an active layer overlaying the substrate layer and having the property of emitting light in a visible region of the electromagnetic (EM) spectrum when a voltage is applied across the active layer;

a transparent anode electrode overlaying the active layer and adapted to have a second voltage applied thereto, the transparent anode electrode including a transparent metal stack having a layered structure including alternating metal and interstitial layers formed on one another to exhibit a photonic band gap (PBG) structure for transmitting a visible wavelength range of the EM spectrum, wherein the transparent anode electrode transmits the light in the visible region emitted by the active semiconductor layer in response to the first and second voltages being respectively applied to the cathode and anode electrodes.

32. The device of claim 31, wherein the transparent anode electrode has a surface conductivity less than 0.2 Ohm/sq.

33. The device of claim 31, wherein the transparent metal stack includes

a first metal layer having a first metal thickness;

a first interstitial layer having a first interstitial thickness formed on the first metal layer;

a second metal layer having a second metal thickness formed on the first interstitial layer;

a second interstitial layer having a second interstitial thickness formed on the second metal layer; and

a third metal layer having a third metal thickness formed on the second interstitial layer, wherein an arrangement of the metal and interstitial layers exhibits the photonic band gap structure.

34. The device of claim 31, wherein the LES device is a light emitting diode (LED).

35. The device of claim 34, wherein the substrate layer is a semiconductor substrate layer made of a Silicon Carbide (SiC) composition.

36. The device of claim 34, wherein the active layer is an active semiconductor layer made of a Gallium Nitride (GaN) composition.

37. The device of claim 34, wherein the active semiconductor layer emits a range of EM wavelengths between 426 and 468 nanometers.

38. The device of claim 31, wherein the LES device is a light emitting polymer (LEP) device.

39. The device of claim 38, wherein the active layer is an active polymer layer.